UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SUMMARY REVIEW OF MONTHLY REPORTS[1]
FOR
SOIL CONSERVATION SERVICE--RESEARCH[2]
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EROSION CONTROL PRACTICES DIVISION

Effect of Different Methods of Fall Tillage on Moisture Intake - F. H. Siddoway, St. Anthony, Idaho

"Frozen soil and sudden spring thaws of the winter snow cover are the most serious causes of erosion in southeastern Idaho's dry farm area. A large portion of the winter moisture is also lost in the erosion process. This moisture loss can be a significant factor in crop production in a 9-inch to 15-inch precipitation area.

"Fall tillage plots were established on a contour-stubble strip in the fall of 1951 for the purpose of determining the effectiveness of different methods of fall tillage in intercepting and retaining runoff water from melting snow. The stubble strip was between two fallow strips. The slope is approximately 12 percent and the surface layer of the soil was frozen to a depth of about 8 inches.

"Moisture samples taken on the plot area last fall after harvest, September 25, showed an average of 9.00 inches of moisture in 6 feet of soil.

"All of the fall tillage work accomplished by the different implements resulted in significant increases in moisture intake over the nontreated plots.

"Although the rough condition the soil is left in is undoubtedly instrumental in facilitating water penetration, the main benefit is attributed to the opening left by the chisel tool. This opening serves as a reservoir which holds the runoff water until the soil thaws. The presence of this water also increases the rate of soil thaw and is an important reason for the additional water in the treated plots. This reasoning is borne out by the fact that the Noble chiseling which leaves a large opening caused more moisture to enter the soil than the Jeoffry even though the surface soil was not left in as rough a condition.

"There was no significant difference between 'shallow' and 'deep' tillage of the two implements tested at different depths.

"Since fall subsurface-tillage work necessitates a high power requirement, the extra moisture attributed to deep tillage is not considered justifiable.

"The fallow strip above and below the contour-stubble strip where the plots

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[2]All research work of the Soil Conservation Service is in cooperation with the various State Experiment Stations.

were established averaged 16.42 inches of moisture for the 6-foot soil depth. This is only 1 inch of moisture more than the average of the fall subsurface-tilled stubble plots."

Erosion Control Practices - T. L. Copley, Raleigh, N. C.

Residue Effects During Major Rain - "Results of a 2.18-inch rain of August 29-31, on our Cover Crop and Residue Management Experiment are shown in the following table. This was the first major rain of the summer with even moderate intensity and which resulted in significant soil loss. In fact, it was the heaviest soil loss caused by any rain during the 4-year period of the experiment.

Table 1.--Runoff and soil loss from 2.18-inch rain, August 29-31, 1952
Cover Crop and Residue Management Experiment, average 4 reps.

Treatment	Runoff	Soil loss
	Inches	Tons/Ac.
1. Check	0.76	0.81
2. Rye grass, turned early	.70	.80
3. Rye, turned early	.73	.61
4. Rye, turned late	.63	.39
5. Rye-vetch, turned late	.73	.52
6. Rye, balk mulch	.41	.26

"These results follow rather closely those of previous years. Early-turned winter covers caused no reduction in runoff. Late-turned rye reduced runoff moderately, while the mulch-balk method cut runoff almost in half. Early-turned rye grass caused no reduction in soil loss, but early-turned rye helped more than usual. Early turning of the rye, however, was delayed by wet soil at the normal turning time and considerable stalk material developed. Late-turned rye was better than the rye-vetch combination and reduced soil loss to half that of the no cover. Rye-mulch balk was again most effective, and reduced soil loss to less than one-third the check.

Flattening Row Middles Reduces Soil Loss - "The table below shows effects of flat cultivation and flat middles between ridged rows. There was no reduction in runoff but soil loss was cut in half with the flat middle, as compared with the conventional V-middle. Results of this rain followed closely those of previous years.

Table 2.--Runoff and soil loss from 2.18-inch rain, August 29-31, 1952
tillage studies, average 2 reps.

Treatment	Runoff	Soil loss
	Inches	Tons/Ac.
High Ridge, V-middle	0.61	0.68
Low Ridge, V-middle	.61	.55
High Ridge, flat middle	.57	.34
Flat Cultivation	.74	.32

Soil and Water Loss - G. N. Sparrow, Tifton, Ga.

"There were two rains during the month which caused measurable losses of soil and water while another rain caused water loss only. Total rainfall involved in the three rains was 4.97 inches. Little information of immediate value was gained from data taken.

"Losses of soil and water were consistently higher from plots in corn than from any other plots. Although peanuts had been taken up prior to one of the rains, peanut plots ran second in quantity of soil and water lost.

"Least losses of soil and water were from plots having good vegetal cover, as is to be expected. Least losses from these plots was from a well-established sod of Coastal Bermuda grass. Crotalaria and native grasses on oats stubble lost considerably more soil and water than did the Bermuda grass. First year Pensacola Bahia permitted the greatest loss from vegetated plots.

"In all cases losses of both soil and water were relatively minor. All measurements were taken from plots on 3 percent slopes of Tifton sandy loam."

Soil Erosion Practices - E. C. Richardson, Auburn, Ala.

"The availability of power equipment enables the farmer to grow a larger acreage of winter crops for soil protection and soil building and to properly use them in rotations. As a result of the power equipment, it is now possible to handle all of the areas in most farms in winter crops that are not otherwise protected by soil-conserving crops. These areas should be planted to annually seeded grasses and legumes or to the reseeding grasses and legumes.

"In order to use reseeding legumes, it was necessary to determine the amount of seed produced by the different legumes and the number of years that each would volunteer to satisfactory stands.

"In 1949 seven legumes were seeded at Auburn on Norfolk loamy sand. Button, clover, subterranean clover, crimson clover, Manganese bur clover, smooth vetch, hairy peas, and grandiflora vetch were seeded in this test. Also, in the same year, a similar test was started on the Piedmont Substation at Camp Hill, Ala. This test was located on Cecil sandy clay loam soil. At Camp Hill, woollypod vetch and ball clover (annual white) were seeded in addition to those seeded at Auburn. Both plantings were successful, and large yields of seed were made in the summer of 1950.

Table 1.--Yield of winter legume seed at Auburn and Camp Hill, Ala.

Crop	Yield at Auburn			Yield at Camp Hill		
	1950	1952	Average	1950	1952	Average
			Pounds per acre			
Button clover	460	735	570	501	517	509
Manganese Bur clover	0	0	0	43	117	80
Subterranean clover	213	506	359	484	107	296
Crimson clover	532	0	266	418	278	348
Ball clover	--	--	--	360	373	366
Smooth vetch	484	160	322	1,028	480	754
Wollypod vetch	--	--	--	605	330	468
Grandiflora vetch	605	709	657	665	587	662
Hairy peas	847	789	818	1,492	597	1,044

"Note: Legumes were planted in 1949. Seed were produced in 1950 and followed with sorghum. Legumes were turned green in 1951 and followed with corn. Seed in 1952 were from volunteer stands."

Irrigated and Unirrigated plots Which are Split for Three Planting Rates and Three Nitrogen Fertilizer Rates - F. W. Schaller, Ames, Iowa

"On August 5 a field day was attended at the Conesville Experimental Farm. This farm is located in eastern Iowa on fine river sand. An irrigation study on corn in cooperation with the Agricultural Engineering Department was presented to the farmers of the area. The experiment consists of irrigated and unirrigated plots which are split for three planting rates and three nitrogen fertilizer rates. The planting rates are approximately 10,000, 15,000, and 20,000 plants per acre. The nitrogen rates consist of 60, 120, and 180 pounds per acre elemental nitrogen side-dressed as ammonium nitrate. A blanket application of phosphate and potash was also used. Four irrigations have been applied so far and results have been excellent. Corn normally yields 20 to 30 bushels per acre without water or fertilizer on this land. It appears now that irrigated and heavily fertilized corn will yield over 100 bushels per acre. Under irrigation there is a marked interaction between the nitrogen levels and planting rates. Corn yields will be obtained this fall. Also, corn-leaf samples have been obtained to provide greater information on the fertilizer study.

"August observations made on cover-crop seedings in corn indicate that good stands and growth have been obtained from rye and vetch, wheat, sweet clover, alfalfa-timothy, and foxtail. Growth in wide-space corn rows is much superior to that in conventional 40-inch rows. Rust has severely damaged wheat stands and is beginning to attack the rye seedings. All seedings were made in late June or early July."

Erosion Control Practices - D. D. Smith, Columbia, Mo.

"The August rainfall materially helped the development of soybeans and corn, so that present prospects are for fair yields. Soil moisture on August 8 was below the wilting point under corn to a depth of about 40 inches. There was evidence of corn roots penetrating and feeding at this depth. The 5.68 inches of rain falling after this date was practically all absorbed by the soil and should be sufficient for maturing of the crops.

"Runoff and soil loss under corn and beans during the 1952 growing season have been exceptionally small, as shown below:

Crop and rotation	Runoff	Soil loss
C - O (no treatment)	0.39 in.	0.3 T/A
C*- SB - W - M - M	.01	Trace
C - SB*- W - M - M	.08	Trace
C - O & sweet clover	.11	.1
C - W - M - M	Trace	0

*Mulch tillage - other corn plots plowed.

"Corn on the mulch-tillage plots following meadow appears equal to comparable plots that were plowed. The soybeans in 21-inch cultivated rows on the mulch-tillage meadow areas are more weedy than those on plowed-meadow areas.

"What effect does spring grazing have on tall fescue seed yields? Some trials at the farm last spring give some preliminary information on this question. Cattle were pastured through the winter to two different dates in the spring on two plots. Grazing to April 1 did not depress seed yield. The data are tabulated below:

Date cattle removed	Sample No. 1	No. 2	No. 3	Average
March 11	420	540	400	453
April 1	480	520	520	507

"In another trial, clipping at 2-week intervals showed seed-yield reductions by clipping any time in April. These data are tabulated below:

Date of last clipping (2" to 3" tall)	Height in unclipped section	Seed yield Lbs/Acre
Not clipped	-	380
April 7	4 inches	250
April 21	6 inches	300
May 5	11 inches	110

"It would appear desirable, therefore, not to graze tall fescue after April 1 where a seed crop is desired at this latitude. Grazing should cease as soon as the soil begins to thaw to prevent damage to the soil structure and the stand of grass."

Effect of Land Resting on Sweet Corn Yields - G. D. Brill, New Brunswick, N. J.

"Resting cultivated land for a year in close-growing, organic matter-producing crops has resulted in reduced soil and water losses and increased yields of subsequent crops. We have a series of plots at Marlboro which have been rested twice. In 1946 the resting crops were clover and timothy sod, ryegrass and vetch, soybeans with winter cover crops, and broadcast field corn with winter cover. Sweet corn followed by a winter cover crop of rye was grown for 3 years after the resting treatments. In all cases as much or more sweet corn was produced in the 3 years after resting than in 4 years where sweet corn was grown continuously with a rye cover crop.

"In 1950 the plots were again rested and sweet corn has been grown on these areas for the past 2 years. A mixture of ryegrass and vetch has been used for a winter cover crop. The resting treatments and yields of sweet corn for 1951 and 1952 are shown in table 1, which appears on page 6.

"During the 1951 season rainfall was about normal and reasonably well distributed. The spring of 1952 was very wet, resulting in poor stands and some wilt. In addition, a short severe drought occurred in July further reducing yields.

"Ryegrass and vetch when used as a winter cover crop has produced consistently higher yields of sweet corn than rye or ryegrass alone due to the increased supply of available nitrogen. However, when allowed to remain throughout the growing season the vetch died out leaving only the ryegrass. This resulted in a relatively low yield of sweet corn in 1951.

Table 1.--Sweet corn yields following land resting

Resting treatment	No. 1 ears per acre 1951	1952
Continuous sweet corn (Ryegrass and vetch cover crop	10,220	6,570
Ryegrass and vetch - for 1 year	7,020	7,210
Fall seeded sweet clover	10,090	8,810
Alfalfa sod (1946-50)	13,170	6,760
Soybeans with winter cover	11,790	6,440
Sudan grass and soybeans with winter cover	10,930	8,590

"The soybeans alone and the alfalfa sod resulted in good yields of sweet corn in 1951 but their residual effect on yield was small in 1952.

"The fall seeded sweet clover made a vigorous growth in 1950 and supplied considerable organic matter as did the sudan grass and soybeans. Yields from these treatments were comparatively low in 1951 but the residual effects of the large amounts of organic matter gave high yields in 1952."

Pasture Irrigation - G. R. Free, Ithaca, N. Y.

"Accumulated yields for the season to date from irrigated pasture at the high fertility level show no increase due to irrigation (3.73 tons per acre dry matter from seven cuttings without irrigation compared to 3.79 with irrigation). At the low fertility level the comparison was 1.86 and 2.50, an increase of 34 percent. Near the end of the month, however, the indications were that water was very definitely becoming the limiting factor and that subsequent yields from the unirrigated plots would be very low regardless of fertility level unless substantial rains were forthcoming. This is what might be expected in periods of extreme drought. It should provide us with some very interesting data."

Results of Pasture Development and Fertilization - H. A. Daniel, Guthrie, Okla.

"The cattle used in the grazing studies were in the experimental pastures from May 1 to August 25, 1952. During this period of 116 days they made the following gains:

Kind of pasturage and land	Kind of fertilizer pounds per acre	Pounds animal gain or beef per acre
1. Native grass on eroded land	None	57
2. Native grass on eroded land	Equivalent of 100 lbs. superphosphate 100 lbs. ammonium nitrate	85
3. KR bluestem mixed with weeping lovegrass on eroded land	250 lbs. of 16-70-0	155
4. Native grass virgin cleared land	None	96
5. Native grass virgin land recently cleared with chemicals	None	104
6. Native grass virgin cleared land	Equivalent of 100 lbs. superphosphate 100 lbs. ammonium nitrate	134

"Fertilizer greatly increased beef and grass production. The results were more outstanding on the eroded land. The pastures on virgin land, formerly in brush, also produced approximately twice as much beef as those on eroded land. The one that was cleared in 1946 and 1947 with chemicals produced slightly more beef than that cleared mechanically in 1935 and 1936."

Crops and Livestock Production - H. O. Anderson, La Crosse Wis.

"Only slight differences in crops and livestock production as well as in net income were found in a study of data from three groups of Lincoln County Soil Conservation District farms classified on the basis of natural drainage conditions. These groups include (1) poorly drained soils such as Poskin, Hadder, Freer, Almena, etc., (2) moderately well-drained soils such as Freon, Brekaw, Santiago, Trappe, etc., and (3) Kennan, Onamia, Goetz, etc. Production on droughty soils such as Vilas and Omega were somewhat lower than for the heavier soils.

"However, on a per acre basis, the moderately and well-drained heavier soils were more profitable than both the poorly drained farms as well as the drought soils. On an acreage basis, the size of these farms were about the same as the average for Lincoln County as shown in the U. S. Census for 1945 and 1950.

Table 1.--Acreage of farms grouped according to soils and averages for the county, 1944 and 1949

	Group 1	Group 2	Group 3	Group 4	U. S. Census 1944	U. S. Census 1949
Acres in farm	149	145	162	152	140	153
Acres harvested	47	42	41	40	37	38

"Considering applications of commercial fertilizers, average yields were slightly higher on the moderately well-drained soils than were the yields for the other groups. This is relfected in slightly higher livestock carrying capacity on these farms.

Table 2.--Crop yields, 9-year average, 1943-51

	Group 1	Group 2	Group 3	Group 4	Lincoln County
Hay	1.9	1.9	1.9	1.7	1.6
Oats	47.0	46.0	41.0	44.0	42.0
Corn silage	7.1	8.1	7.3	6.8	7.7
Fertilizer used, lbs.*	112	88	98	72	
Livestock units per 100 acres	43.5	47.3	47.3	40.0	

*Pounds per crop acre.

"Further study will be made of production and income possibilities as well as of land clearing and soil-conservation costs on the different soils groups under comparable management. A report of these analyses will be prepared later."

Soil Erosion Practices - J. Vicente-Chandler, Rio Piedras, Puerto Rico

"The cotton in the tanks at Aguirre is in good condition. Most of the bolls should be ready for harvesting within the next few weeks. The planned moisture levels were in effect during most of the month. The plants with the driest treatment clearly showed signs of drought. Heavy rains at the end of the month thoroughly wetted the soil in all the tanks.

"The four most promising methods of planting sugarcane with furrow irrigation are being tested further and on a larger scale in a new field at Aguirre. Two of the six methods tested initially were discarded on the basis of results obtained from the trials already carried out."

Stubble Mulch Tillage - C. J. Whitfield, Amarillo, Tex.

"In the fall of 1951, a chiseling test was started to check the effect of depth and width of chiseling vs. stubble mulch sweep tillage for storing soil moisture during a fallow period. Duplicate plots were set up for seven types of fall land management. These were: (1) delayed fallow--no fall treatment, (2) cultivation with stubble-mulch sweep machine 5 inches deep, (3) chisel 5 inches deep with 1-foot spacing, (4) chisel 5 inches deep with 27-inch spacing, (5) chisel 10 inches deep with 27-inch spacing, (6) chisel 10 inches deep with 3-foot spacing, and (7) chisel 10 inches deep with 4-foot spacing. All cultivations starting in the spring of 1952 and continuing through the remainder of the fallow period were done with the stubble-mulch sweep machine on all plots.

"Soil-moisture samples were taken the last of August to determine the amount of moisture stored in the 6-inch to 24-inch soil layer. The amount of available soil moisture ranged from 1.1 inches to 1.2 inches on all treatments, with the exception of chiseling 10 inches deep with 27-inch spacing. This method showed 0.7 inch of available moisture. This close chiseling seems to cause a loss of moisture during a dry season such as we have just experienced. If heavy rains occur later this season, additional samples will be taken to follow through on the test. All plots will be planted to wheat this fall. It is also interesting to note that there is only a third as much available moisture stored in land cropped continuously to wheat."

Runoff from Continuous Cotton Plots on Class III Land. B. H. Hendrickson, Watkinsville, Ga.

"Four runoff periods occurred during the month. Two excessive and one 'near excessive' rate storms were recorded. These storms caused almost double the 12-year average erosion for the month as determined by continuous cotton runoff plots on Class III land. This comparison is given below:

	Rainfall In.	Runoff In.	Erosion Tons/Ac.
12-yr. av. continuous cotton for August	4.29	1.29	2.22
1952 continuous cotton for August	6.05	1.48	4.03

Soil Erosion Practices - J. B. Pope, Brownfield, Tex.

"The promising cotton and grain sorghum prospects at the end of July failed to get enough moisture in August to keep up hopes. Many fields of both cotton and grain sorghum have passed out completely. Late planted sorghum is still green and should rains come soon enough in September, a fair amount of protective cover could be produced before cold weather, otherwise the winter protection prospects for the area is very unfavorable."

Soil Erosion Practices - R. M. Smith, Temple, Tex.

"Land preparation has continued both with the Dempster, subtillage tool, and with the triple disk plow. However, since the middle of the month disk plowing has been discontinued because the ground is too dry and hard. The Dempster tool, with chisels, is still being used and seems to be doing a good job in spite of the dryness. After chiseling, it is possible to use subsurface sweeps for more thorough land preparation. The job being done appears to leave the soil in an excellent condition to receive water. Additional problems are expected in the handling of residues and control of Johnsongrass, but experience to date with the Dempster tool are encouraging. For certain purposes, at least, such as the chiseling of ground that is too hard for disk plowing, there seems to be little doubt about real advantages over standard practices. Possible effects of subtillage on runoff will be measured by gaging from terraced land where a comparison with disk plowing has been provided in our terrace-maintenance study.

"One other use being tested with the Dempster tool is pasture renovation. We have used both the chisels and the duckfoot shovels on small areas of KR bluestem and Bermudagrass-buffalograss pasture to be ready for some fall seeding and fertilization. The tillage jobs appear to be good, considering the hardness of the soil.

"We have continued accumulating soluble nitrate and soil-moisture data at selected locations representing conditions of major interest, as well as some additional soil descriptions and estimates of practical soil characteristics. With the cooperation of SCS Operations we have set up tentative, relative standards of property ranges for the main soil types (or SCS soil units) recognized in the blacklands. This approach provides a framework and basis for comparison of soil descriptions and data. Along with our soil-moisture sampling we are checking wilting coefficients (pF-4.2) and moisture-holding capacity under low tensions in the laboratory. These results provide some basis for understanding and interpreting field-moisture values, particularly as to the moisture tension represented."

DRAINAGE AND WATER CONTROL DIVISION

Hydrologic Studies - L. L. Harrold, North Appalachian Experimental Watershed, Coshocton, Ohio

"Most of the 2.01-inch August rainfall came on 2 days, August 9 and 16. Although moisture in the soil was at a very low point, some runoff and erosion on cornland resulted from these two storms. Loss of water and soil on the conservation-practice watersheds as well as on mulch and on Krilium-treated areas was less than on the check watershed as indicated below:

Period	Losses from cornland watersheds Nos.--									
	106 (Check)		121 (Conservation)		188 (Mulch)		191 (Krilium)		185 (Strip cropped)	
	Soil	Water	Soil	Water	Soil	Water	Soil	Water	Soil	Water
	Lbs/acre	In.	Lbs/acre	In.	Lbs/acre	In.	Lbs/acre	In.	Lbs/acre	In.
August	1,180	0.42	197	0.16	7	0.001	0	0	1	0.003
June, July, August	17,100	2.41	3,180	1.08	65	.05	20	.007	85	.14

"Mr. Dreibelbis reports that soil-moisture observations show very low values--near wilting point--near the end of the month (table follows):

Table 1.--Soil moisture in corn watersheds, August 28, 1952

Soil depth	Mulch Watershed 188	Krilium Watershed 191	Krilium in subsoil Watershed 191A	No Krilium no mulch Watershed 191B
Inches	% vol.	% vol.	%vol.	% vol.
0-1	5.1	6.7	6.5	5.4
1-4	6.3	7.1	7.1	5.7
4-7	6.2	7.8	7.0	5.7
7-10	6.3	8.3	7.2	5.2
10-14	6.5	8.9	7.7	5.5
Total 0-14	Inches water 0.88	Inches water 1.12	Inches water 1.02	Inches water 0.77

"Moisture in the mulch soil was just slightly greater than that in the check area and that in the Krilium the greatest of all of the corn areas."

Hydrologic Studies - J. A. Allis, Central Great Plains Experimental Watershed, near Hastings, Nebr.

"August was very dry with only 1.37 inches of precipitation measured at the meteorological station. Only 0.35 inch fell between August 1 and 28 which was a very critical period for corn development. Observations show that the corn which was subtilled and planted on the contour withstood the dry period much better than the corn which was planted in straight rows. Our yield figures this year should be interesting.

"The past 58 years of precipitation record in Adams and Webster Counties show an average of 33 drought days per year in the 6 months' growing season. In the past 5 years, 1947 to 1951, we averaged 32 drought days per year in the 6-month period. Our average annual corn yields for 1947 to 1951 were 25.8 bu/acre straight row, 30.3 bu/acre subtilled, and 34.0 by/acre contour farmed. These results indicate the value of conserving the water when it falls to carry the crop through the critical dry periods.

"Aerial photographs were received of watersheds W-3 and W-5 taken in June 1937 and in June 1951. In the 14 years there is considerable evidence, by the

photographs, that there was more erosion on W-3 in 1951 than there was in 1937. The photograph of W-5, taken in June 1951, shows the terraces which have been built and evidence that other measures are being applied to conserve the land."

Hydrologic Studies - G. A. Crabb, Jr., East Lansing, Mich.

"A preliminary copy of a manuscript: 'Insolation--A Primary Factor of Evaporation at East Lansing,' having been cleared for publication by officials of the Michigan Agricultural Experiment Station, was forwarded to the Washington Office for clearance August 14. It is proposed to publish this paper in an early issue of the Quarterly Bulletin of the Michigan Agricultural Experiment Station.

"August 22, the Station Supervisor participated in a discussion in the State Conservator's office concerning the growing use of irrigation practices in Michigan. Present were: E. C. Sackrider, State Conservationist; H. D. Lakin, Assistant State Conservationist; Tyler Quackenbush, Division of Engineering, Washington office; K. H. Beauchamp, Regional Engineering Division; G. L. Sherman and J. W. Waterman, Michigan SCS Engineers; P. E. Schleusener and Jack Davis of the Department of Agricultural Engineering, Michigan State College. This discussion was held to summarize observations made by the group throughout Michigan, and to lay tentative plans regarding Operations' approach to the growing use of irrigation in Michigan. It was agreed that the field of irrigation showed the greatest need for further research of almost any soil-conservation practice in Michigan, and that relatively short-term research projects (say 5 years) can probably produce major results. It was recommended that State and Federal Agencies cooperate in assembling the available Michigan water and irrigation data into a handbook for use in in-Service training with both agencies. It was further recommended that an intensive program of cooperative, in-Service training be embarked upon in an effort to train technical personnel in the basic fundamentals of irrigation."

Hydrologic Studies - A. W. Cooper, Auburn, Ala.

"The August rainfall of 8.55 inches represents 183 percent of the 71-year average of 4.67 inches for Auburn.

"Two rains of 1.31 inches and 1.81 inches caused runoff and soil loss from the cotton plots. No runoff occurred from the plots in corn, fescue grass and Ladino clover, sudan grass, or alfalfa (table 1).

Table 1.--Soil and water losses from erosion plots, Auburn, Ala.

Plot No.	Slope %	Vegetal cover	Rainfall - 1.31 inches August 8, 1952		Rainfall - 1.81 inches August 11, 1952	
			Water loss inches	Soil loss lb./acre	Water loss inches	Soil loss lb./acre
1	2-1/2	Alfalfa	0	0	0	0
2	5	Sudan	0	0	0	0
3	5	Cotton	0	0	.17	22
4	5	Cotton	0	0	.15	43
5	10	Fescue & Ladino	0	0	0	0
6	10	Cotton	.41	107	.65	740
7	10	Fescue & Ladino	0	0	0	0
8	10	Cotton	.50	255	.66	670
9	20	Corn	0	0	0	0
10	20	Corn	0	0	0	0

Table 2.--Summary of infiltration tests made with the infiltrometer on Alabama soils (August 1952)*

Test No.	Soil type	Soil surface condition	Depth of topsoil in.	Infiltration: Total in. 1st hr.	Infiltration: Total in. 2d hr.	Infiltration: Rate at end of in./hr. 1st hr.	Infiltration: Rate at end of in./hr. 2d hr.	Initial soil moisture (%): Depth (inch) 0-6	6-12	12-18	18-24
								%			
114,115	Marlboro FSL	Poor grass sod	9	0.93	0.52	0.54	0.50	9.7	12.1	15.8	17.1
117	Tifton FSL	Bare	8	.87	.37	.48	.33	8.2	13.1	14.9	16.1
118,119	Faceville FSL	Bare	10	.89	.37	.48	.33	7.8	11.9	17.0	17.9
120,121	Red Bay FSL	Poor grass sod	9	1.40	.84	1.24	.72	8.4	11.4	14.5	15.1

*Data obtained jointly by SCS Research and Operations.

"In cooperation with SCS Operations personnel, eight infiltration measurements were made, using the simulated rainfall type-F infiltrometer (table 2). These tests were made on Marlboro F. S. L., Tifton F. S. L., Faceville F. S. L., and Red Bay F. S. L. in the west part of Escambia County. Table 2 appears on page 12.

"Permeability measurements of the above soils are reported in table 3:

Table 3.--Permeability of soils (Alabama)*

Depth of sample	Field moisture content	Moisture content saturated	Percolation: Field moisture	Percolation: Saturated	Volume weight	Water drained: 15 min.	Water drained: 15 hr.
Inches	Percent	Percent	In./hr.	In./hr.	Gm/cc.	Cc/100 gm.	
Faceville F. S. L.							
0"-10"	9.5	29.0	4.4	1.5	1.47	5.85	8.83
10"-24"	16.3	28.9	1.2	2.0	1.49	5.67	7.93
Red Bay F. S. L.							
0"-9"	8.6	29.5	3.4	3.4	1.46	5.19	9.95
9"-24"	12.8	26.4	3.0	3.7	1.57	6.07	8.23
Tifton F. S. L.							
0"-8"	7.9	27.7	2.1	.8	1.48	4.84	7.72
8"-21"	13.0	24.9	2.0	2.0	1.62	5.65	8.98
21"-26"*	15.2	29.2	.6	1.8	1.63	5.22	7.16
Marlboro F. S. L.							
0"-9"	11.6	36.0	.7	1.2	1.41	4.42	7.37
9"-14"	17.1	27.9	0	1.0	1.69	2.85	3.53
12"-24"	18.2	31.1	.1	1.4	1.56	3.26	6.01
7"-10"**	14.9	27.7	.5	.9	1.70	2.69	3.56

*Data obtained jointly by SCS Research and Operations.
**Plow pan layer.

Hydrologic Studies - T. W. Edminster, Blacksburg, Va.

"Mr. Holtan reports that Messrs. Turner and Holtan spearheaded the final development and construction of a soil-core-permeameter which has capacity for 10 soil cores run simultaneously. A 50-gallon drum on the mezzanine floor above is used to store the water until it reaches room temperature and to supply water to the soil-core surface. The 6- to 9-foot head from the drum to the apparatus provides ample supply for even the most permeable cores. The level of the water on the soil-core surface is controlled by a standpipe in the line which can be adjusted to the desired height. This standpipe overflows during the run thereby guaranteeing a constant level of water on the core surface. The supply drum can be readily refilled from the public water system through a valve plumbed into the apparatus.

"Cores can be run individually or as many as 10 at once. Also by a very simple arrangement with a ring stand longer cores or stacks of cores can also be run. Several runs were made using 4 of the 3-inch cores stacked to simulate a soil profile. These cores were stacked under water to maintain saturation and the joints sealed by placing a wide rubber band around the core junctions. These runs were made primarily to aid in the development of technique. Data were not analyzed

thoroughly, but it appears that the stacks of cores has a permeability essentially equal to or slightly less than the least permeable individual core determination before stacking.

"Hydrographs for the three small watersheds at the Agricultural Engineering Farm for the storm of August 8, 1952, were analyzed by the time-condensation method. Results indicate that the instrumentation is satisfactory and that the watersheds do not have any surface drainage irregularities, such as undue pondage, which would cause unusual hydraulics.

"Some progress was made in the detention-discharge studies, but complete information on both the hydrograph and the watershed terrain are hard to obtain. The current practices of reporting peak rates only or daily averages of flow rather than the detailed hydrograph place a strict limitation upon the usefulness of published data. These reports can be used only for probability studies and often, especially on smaller watersheds, the continuity of the record or the duration (or both) are insufficient for valid probability analyses."

Supplemental Irrigation Studies - J. R. Carreker, Athens, Ga.

"The period of excessive heat reported at the end of July continued through August 22, after which the temperatures ranged below maxima of 90 each day. Total rainfall was 5.48 inches, but there were 17 days without rain between the 12th and 29th. Evaporation from the pan was 6.10 inches, but only 72 miles of wind movement were recorded.

"Rains during the first 12 days of August totaled 3.72 inches. Soil-moisture measurements on the plots at Watkinsville showed this water penetrated below 18 inches on the irrigated plots, but only 12 to 15 inches deep on the previously very dry unirrigated plots.

"The tomato harvest was completed September 2. Yield records showed the following differences:

Irrigated tomatoes	=	18,915 lbs/acre	
Unirrigated "	=	6,452 " "	
Difference	=	12,463 " "	= 193%

"Several newspaper articles have been noticed on irrigation in recent weeks. One reprinted in the Atlanta Journal on September 2 from the Ocilla Star is quoted below:

"Irrigation of South Georgia and Irwin County farms has been increasing for several years. This year has demonstrated conclusively the economy of preparing for droughts. Many farmers have paid for their investment with increased production the first year.

"Lakes and ponds which are found on many farms in this section, have provided the supply of water in the most instances. Building dams is more expensive but pays good dividends and more and more farmers will seek this means of relief from ruinous dry spells in the future.

"It is said more food can be raised on an acre of water than an acre of land. Well stocked lakes provide besides a constant water supply for crops a varied recreation for owners and we expect to see a constant rise in the number of irrigation

systems put to use in this county.

"Studies were made during August of the distribution of roots under the irrigated and unirrigated corn and cotton and sericea. The oven-dry weights of these roots are tabulated below:

	Irrigated	Unirrigated
	Tons per acre	
Corn:		
Crown & brace roots	0.356	0.100
Feed roots: 0-6" depth	.633	.311
6-12" depth	.092	.026
12-18" depth	.043	.025
Cotton:		
Crown, tap and primary roots	.240	.127
Feed roots: 0-6" depth	.140	.178
6-12" depth	.060	.033
12-18" depth	.051	.032
Sericea lespedeza:		
Crown and tap roots		1.95
Feed roots: 0-6" depth		1.20
6-12" depth		.57
12-18" depth		.27
18-24" depth		.21
24-30" depth		.18

"Roots extended below 30 inches, but other work prevented us from pursuing this study further. A very few cotton and corn roots also extended below 18 inches under both the irrigated and unirrigated plants.

"A mulch of leaves and stems covered the soil 1/2 to 3/4 inch deep under this sericea. The oven-dry weight of this mulch was 5.95 tons per acre. When saturated for 24 hours in water, then after free drainage by gravity, this mulch held 0.125 inch of water."

Supplemental Irrigation Studies - T. W. Edminster, Blacksburg, Va.

"The total rainfall for the month was approximately 9.29 inches with a very good distribution.

"The pasture-irrigation system was only operated for demonstrational purposes. The herbage growth on the check lots made a relatively quick recovery and for the past 15 days there has been little or no difference in the amount of herbage available for grazing."

"On the system of control plots the third cutting of alfalfa was sampled on August 18. On several of the irrigated burley tobacco plots excessive rainfall has caused some crop damage."

Drainage Studies - M. H. Gallatin, Homestead, Fla.

"Rainfall for the month varied from 3.42 for the Eureka gage to 12.66 inches for the Piowaty gage. Going over the records of the past years, it will be noted that the heaviest rains during August have occurred in the southwestern, midwestern, and northwestern portions of the area with lighter rainfall recorded for the areas north and east.

"The average for all of the gages in the area has remained about the same. In 1952, 7.59; 1951 7.03 inches; 1950 7.52 inches; 1949 6.07 inches; 1948 9.58 inches; and 8.78 inches in 1948. In the middle to western portion of the area rains were recorded on 19-21 days while in the northeast and eastern portions of the area rains were recorded on 6-9 days."

"A check of the plots at the Highlands water-control plots at the end of the month showed that the areas treated with CMU 40 pounds per acre were completely free of vegetation while those on which TCA was used weed growth and grasses were coming back. The areas treated with a mixture of CMU and Ammate were free of all growth. The pothole area where willows were walked down and sprayed with Ammate were almost completely free of growth. Standing willow and bay sprayed with Ammate still show no signs of growth. The Canal area where CMU was applied as a dust at the rate of 40# per acre remained free of all bottom growth. The question now is how long will CMU or a mixture of CMU and Ammate control the growth and will land so treated be usable the next season. Observations will continue to be made on these areas to determine this."

Drainage Studies - I. L. Saveson, Baton Rouge, La.

"This season's work plan provides for outfield-test areas on the feasibility of grading sugarcane land to improve the drainage. The purpose of these outfield-test areas is to ascertain if the increased yields and the feasibility of grading land is applicable to all sections of the cane area since the previous work had been confined to the river section near Baton Rouge, La. A further purpose of the outfield-test areas is that they can be used for demonstrational purpose by the soil conservation districts. Operations personnel has helped the project in running levels for the work. The second outfield-test area was completed during the month of August and is located on the Albania Plantation at Jeanerette, La., which is in the western part of the sugarcane area. This area consists of approximately 50 acres of heavy mixed land and was previously divided into 24 cuts of approximately 500 feet long. This area was graded, ditches cleaned and deep tilled. Two head lands were removed, making the cuts approximately 1,000 feet long and dividing the area into 12 cuts. The area was graded with tractor and scraper, motor grader, smoothed with land leveler, and deep tilled with Graham Hoeme plow. An exceptionally good job of grading was secured since the work was interrupted by rains that help settle fills and it also helped locate the small depressions that are not located when the levels are run.

"The machine time on this area is as follows:

Grading the area and cutting the ditches	- 4.68 hrs. per acre
Deep tilling	- .60 hr. per acre
Total	- 5.28 hrs. per acre

"At the writing of this report, work is under way on grading a third outfield-test area on the Godchaux Plantation at Raceland, La., which is in the southern part of the cane area. This test area consists of approximately 40 acres. Earlier in the season the first test area was worked on the Made Wood Plantation, Napoleonville, La., and this area consists of approximately 40 acres."

Drainage Studies - C. B. Gay, Fleming, Ga.

"The rainfall for August was 15.06 inches which was more than four times the normal rainfall. Most of this rain came as afternoon thunder showers and was very beneficial to our established grasses and clovers. The 2-year-old stand of fescue and Ladino clover was mowed low the last week in July and in 3 weeks had grown 6 inches."

Sedimentation Studies - R. Woodburn, State College, Miss.

"Calculations were completed on cross sections taken on arroyo leading from monumented gully (3 miles northwest of Oxford, Miss.) to East Goose Creek. When these sections were compared with 1936 sections, some aggradation was shown but a great deal less than expected.

"The study extended from East Goose Creek channel upward 3,210 feet to a county road. According to our calculations, there had been 14,045 tons of sand deposited since 1936.

"There is a tributary channel entering from the southeast at station 22 on the arroyo, and there hasbeen an undetermined amount of deposit here. It is estimated that it will equal about 10 percent of main arroyo. There is some sand from station 32 + 10, the county road, on to the headwater gullies to the extent of an estimated 5 percent of arroyo quantity. Thus 16,150 tons of sand may be accounted for.

"The exact acreage of gullies in the arroyo watershed has not been determined, awaiting a copy of new 1949, 8-inch scale contact print photo from the Washington Carographic Office. It is estimated, however, that there would be at least 30 acres of critical area gullies producing sand at the rate of 300 tons per acre per year in addition to the other erosion in the watershed.

$$30 \text{ acres} \times 300 \text{ tons/acre} \times 16 \text{ years} = 144{,}000 \text{ tons}$$

$$\frac{16{,}151}{144{,}000} = 11.2\%$$

"It may thus be seen that 11.2 percent of estimated total sand production from the watershed is accounted for. There would, of course, be some incidental deposits below very small gullies which do not connect with the main channel system. This could probably be more than offset by the erosion from the non-gullied area which means that our 'accounted for' percentage may be still smaller than shown. It would appear that at least 89 percent of sand produced by the gullies has been transported from the watershed and would have been received by a dam at the lower end of the watershed. This matter will receive more study as it is of great importance in providing sediment design criteria for dams constructed in this area. Formulae presently in use would tend to give a lower percentage of recovery in a reservoir of erosional material that the 89 percent shown here. It may be that particular treatment may be necessary in cases of this type when very efficient systems of channels transport gully sand downstream.

"The week of August 25-29 was given to field studies in the Big Sand Creek watershed.

"Surveys were made to determine channel slope and typical cross section on Little Sand Creek, Beasley Creek, Little Rock Creek, and Upper Big Sand Creek.

"Thalweg profile was established as follows:"

Little Rock	4,000 feet
Upper Big Sand	6,000 feet
Beasley	6,000 feet
Little Sand	3,200 feet

IRRIGATION ENGINEERING AND WATER CONSERVATION DIVISION

Silt Studies - D. W. Bloodgood, Austin, Tex.

"Progress Silt Report No. 13, Silt Load of Texas Streams (1950-1951) has been completed and multilithed. This report is available for free distribution.

"During the water year of October 1, 1950, to September 30, 1951, the silt load of Texas streams was the lowest of most of the previous years' records. The average silt load for 19 active stations located on 10 of the principal watersheds of Texas and for periods ranging from 9 to 27 years is 36,309 acre-feet. This amount is exclusive of any silt by-passing the Possum Kingdom, Buchanan, Inks, and Corpus Christi Dams. For the water year ending September 30, 1951, the silt load for the same number of stations was 5,648 acre-feet, or about 16 percent of the average amount. The normal discharge of most of the silt-carrying streams is 27,703,689 acre-feet, while for the water year it amounted to only 7,833,840 acre-feet, which is about 28 percent of the normal flow. The subnormal condition is due mostly to the continued drought and lack of hard or torrential rains on the upper portions of the watersheds.

"The silt load by-passing the four dams for the above water year was 135 acre-feet, while the average amount of silt by-passing these dams for periods ranging from 4 to 10 years was 277 acre-feet or 48 percent of normal. The amount of water released from the dams for the water year was 2,452,720 acre-feet. The average amount released was 2,318,142 acre-feet or 11 percent above normal.

"It is planned to use the Division of Irrigation type of evaporation pan as our standard pan for future single pan installations. The American Section, International Boundary and Water Commission, is now using this type of pan for their standard installations.

"Also during the month the American Section, International Boundary and Water Commission at Laredo started the construction of a cooperative stainless steel Division of Irrigation evaporation pan."

Irrigation Studies - N. P. Swanson, Amarillo, Tex.

"Bouyoucos block calibration curves plotted for the 0 to 12-inch, 12 to 24-inch, 24 to 36-inch, and 36 to 48-inch depths of the clay loam soil (soil unit 2) on the Amarillo Conservation Experiment Station indicate that the blocks may be expected to read within 1 percent of the actual soil-moisture content or within

8 percent of the actual available moisture content on this soil unit. Sunflowers in sealed cans were used to deplete the soil moisture for calibration, with five and six replicates for each foot of depth. The 'accumulation zone' in the 4th foot gave lower resistance readings for the same moisture content.

"The use of electrical resistance methods for obtaining soil-moisture contents on these soils is important not only from the standpoint of the labor saved and the increased determinations made possible, but from the fact that repeated physical soil sampling, particularly when the soil is moist, compacts the soil surface in the sampling area rendering it nonrepresentative of the plot."

Drainage Investigations - G. B. Bradshaw, Boise, Idaho

"It was concluded that practically 90 percent of the isolated individual ranch drainage problems in Nevada are due to soil changes. These isolated drainage problems occur when the soils change from a more to a less permeable profile. Alluvial fans, braiding streams, and fans, build up a complicated series of soil changes in the mountain meadows and valleys. The drainage problems are mor acute where the soil changes occur on fairly steep slopes."

Seepage from and Lining of Irrigation Canals - C. W. Lauritzen and O. W. Israelsen, Logan, Utah

"The following is abstracted from 'Seepage from and Lining of Irrigation Canals' by C. W. Lauritzen and O. W. Israelsen, Soil Conservation Service, Utah Agricultural Experiment Station, and U. S. Bureau of Reclamation cooperating, 1952, mimeographed. The detailed report can be obtained by writing to the authors.

"There are more than 15,000,000 acres of arable land in the Western States, for which no irrigation water is available, and several million ares for which the water now available is inadequate. At the same time, about one-third of all water diverted for irrigation purposes is lost in conveyance to the farms. Seepage losses from canals can be controlled by linings. Utah cooperative research is directed toward the development of:

1. More reliable methods of measuring seepage losses.
2. Better and lower-cost canal lining.

"Present emphasis is on improving methods of direct seepage measurement characterization of subgrade materials as a basis for estimating seepage losses, testing of linings in the River Laboratory to determine the effectiveness of different linings in reducing seepage losses, and the rates of deterioration of these linings.

"Materials which appear to have promise for lining canals, or for which more complete information is needed, are installed in irrigation canals at various locations to further test effectiveness and durability, and as a means of finding their usefulness and obtaining information on the influence of site conditions.

"In conjunction with the field seepage measurements, many samples of subgrade materials have been obtained from the canals and the permeability of these materials determined by standard indoor laboratory methods. In addition, attention has been given to the influence of the method upon the results obtained, and

the influence of such factors as stratification and soil treatments upon the permeability. An important property of prefabricated canal linings is their resistance to biological deterioration. It has been found that most organic fabrics are subject to rapid deterioration when exposed in contact with the soil. Other materials such as synthetic rubbers are highly resistant. Relative deterioration, which accompanies the exposure of asphaltic canal linings in contact with soil, is under investigation, and the results will be reported in the near future.

"An outdoor laboratory, was constructed near Logan River in 1945. Linings of various types are installed in these sections and the seepage through these linings measured precisely. The tests include earth linings of various types, asphaltic and soil cement linings.

Seepage measurements on the gravel covered earth linings are summarized in table 1.

Table 1.--Average permeabilities and seepage loss measurements on linings in channel C

Section No.	Lining material	Year	Perm. ft/yr K	Seepage $Ft/Ft^2/24$ hrs S
1C	Trenton Sandy Loam 100 parts and Redmond Bentonite 10 parts	1948	0.14	0.0009
		1949	.37	.0024
		1950	25.60	.1670
		1951	149.00	.9710
		1952	241.00	1.5700
2C	Oasis Silt Loam	1948	.33	.0025
		1949	.07	.0004
		1950	.03	.0003
		1951	.01	.0001
		1952	----	----
3C	Trenton Sandy Loam 100 parts and Henryville Bentonite 10 parts	1948	1.95	.0114
		1949	1.46	.0085
		1950	3.18	.0186
		1951	5.84	.0342
		1952	14.20	.0830
4C	Millville Silt Loam 100 parts and Redmond Bentonite 5 parts	1948	1.29	.0077
		1949	10.19	.0614
		1950	35.40	.2220
		1951	69.60	.4180
		1952	48.30	.290
5C	Salt Lake Silt Loam 100 parts and Redmond Bentonite 5 parts	1948	32.09	.1960
		1949	79.49	.4830
		1950	95.70	.5850
		1951	166.00	1.0140
		1952	104.00	.6350
6C	L-BR-1, Silty Clay Loam	1948	14.21	.0925
		1949	10.32	.0672
		1950	6.44	.0418
		1951	18.60	.1210
		1952	12.90	.0839

Table 1.--Average permeabilities and seepage loss measurements on linings in channel C--Cont'd

Section No.	Lining material	Year	Perm. ft/yr K	Seepage $Ft/Ft^2/24$ hrs S
7C	L-BR-4, Silt Loam	1948	22.44	0.1310
		1949	36.37	.2126
		1950	20.10	.1170
		1951	29.70	.1730
		1952	39.30	.2290
8C	L-BR-3, Clay Loam	1948	13.46	.0924
		1949	24.02	.1623
		1950	18.70	.1260
		1951	28.50	.1920
		1952	21.80	.1470

"With the exception of the oasis silt loam, seepage through all the earth linings has tended to increase. The increase through the soil-bentonite lining has been so rapid that the effectiveness of these linings may be questioned. Some tests are planned which will include soil-bentonite mixtures in which the bentonite content will be 20 percent, to determine if an increased bentonite content will decrease the rate of deterioration.

"Asphaltic materials have received considerable attention for lining irrigation canals in recent years. Because of this, and the possibilities they offer for lower cost linings, special attention has been given to the testing of these materials. Extensive field installations have been made in certain areas, particularly Montana, Wyoming, Idaho, Washington, and Oregon, by the U. S. Bureau of Reclamation. These installations have demonstrated that buried asphaltic membrane linings will effectively control seepage and it is believed that where they are covered adequately they will be reasonably durable. Durability of these linings, however, is one of the most debatable questions concerning their utility. At present there is insufficient information available to estimate their probable life."

Tehachapi Valley Investigation, Kern County, Calif. - C. M. Litz, Los Angeles, Calif.

"The acreage in each land-use classification was compiled for the Tehachapi Soil Conservation District from the survey made in July by the Tehachapi Work Unit personnel. Comparison of acreages of the various crops grown in 1950, 1951, and 1952 show an accelerated increase in the acreage of perennial seed crops, principally alfalfa seed. During this short period these seed crops have become the major crop in the District, as is illustrated by the following table:

Table 1.--Acreage of each crop grown in the Tehachapi Soil Conservation District, California, for the years 1950, 1951, and 1952

Crop	1950	1951	1952
Irrigated			
Alfalfa hay	890	1,092	1,056
Seed, alfalfa, grass, clover	810	1,968	3,598
Potatoes	2,327	2,197	1,336
Grain	350	272	23
Deciduous	110	112	111
Beet seed	199	212	149
Safflower	1,546	0	0
Vegetable seed	0	112	319
Farmsteads, miscellaneous	148	204	250
Total	6,380	6,169	6,842
Dry farmed			
Alfalfa, hay, pasture	321	248	343
Grain	8,407	8,382	6,913
Deciduous	167	76	43
Total	8,895	8,706	7,299
Total farmed area	15,275	14,875	14,141

Snow Surveys and Irrigation Water Supply Forecasts - H. J. Stockwell, Ft. Collins, Colo.

"Summaries of snow-survey measurements for the Platte-Arkansas and the Colorado River Drainage Basins have been published this month. This completes the summary of snow-survey measurements for the period 1936 to 1952."

Performance Tests of Well Screens - C. Rohwer, Ft. Collins, Colo.

"The progress report on the model study of the Effect of Well Screens and Gravel Envelopes on Flow into Wells has been completed and is now being distributed to the cooperators. This report is based on the tests conducted by Frank N. Leatherwood during the fiscal year 1952. The results of the study show that the amount of sand moved at a given velocity is a function of the ratio of the grain size of the gravel to that of the sand. However not enough tests were made to determine the limiting values of this ratio. The tests to develop a natural gravel envelope in a graded sand by surging show that surging reduced the head loss and that it was most effective when the well screen had a small percentage of openings."

Yields from Irrigation of 12 Different Wheat Varieties - W. R. Meyer, Garden City, Kans.

"This year we had 12 different wheat varieties on our plots. The wheat was planted September 26, and was irrigated up on October 2 and 3. In addition to the fall irrigation three spring irrigations were applied of approximately 6 inches each. Due to the hot dry winds that occurred through most of June, we feel that we should have irrigated once more during the 2d week of June. If this had been

done I believe our yields would have increased considerably, for a lot of the wheat was shriveled. The results of the test:"

Table 1.--1952 grain yields and test weights of winter wheat varieties grown under full irrigation in triplicated plots at Agriculture Experiment Station, Garden City, Kans.

Variety	C. I. Number	Test wgt. lbs/grain per bus.	Yields bus/grain per acre
Triumph	12132	61.9	62.0
Comanche X Blackhull-Hard Federation	12517	59.4	51.3
Ponca	12128	59.0	47.2
Kiowa	12133	59.7	44.7
Comanche	11678	58.7	44.2
Red Chief	12109	61.5	44.2
Marquillo-Oro X Oro-Tenmarq	12406	59.0	43.5
Pawnee	11669	59.9	42.7
Blue Jacket	12502	60.9	32.7
Wichita	11952	60.8	30.7
Least Significant Difference		1.43	7.32

10/17/52